UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,246	11/18/2003	Edward William Adams	7725-0001.10	7752

23980 7590 11/28/2005

REED INTELLECTUAL PROPERTY LAW GROUP
1400 PAGE MILL ROAD
PALO ALTO, CA 94304-1124

EXAMINER	
TSOY, ELENA	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 11/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/717,246	ADAMS ET AL.	
	Examiner	Art Unit	
	Elena Tsoy	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/29/2005 has been entered.

Response to Amendment

Amendment filed on 9/29/2005 has been entered. New claims 10-16 have been added. Claims 1-16 are pending in the application.

Claim Objections

1. Claims 12 and 13 are objected to because of the following informalities: "poly(acrylic acid-co-octylacrylamide) seems to be incorrect. For examining purposes it was interpreted as "poly(acrylic acid-octylacrylamide).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bawendi et al (US 6,319,426) in view of Ma et al (US 5,221,334).

Bawendi et al are applied here for the same reasons as set forth in paragraph 5 of the Office Action mailed on 12/10/2004.

Bawendi et al teach that a coating outer layer includes **any** molecule having at least one hydrophobic linking moiety that attaches to the surface of the particle and that terminates in at least one hydrophilic moiety (See column 13, lines 5-28). However, Bawendi et al fail to teach that the block copolymer has a structure of AB block copolymer where A block is hydrophobic and serves to link with the pigment, and the B block is hydrophilic and serves to disperse the pigment in the aqueous medium (Claim 1).

Ma et al teach that a AB block copolymer where A block is hydrophobic and serves to link with a hydrophobic pigment, and the B block is hydrophilic and serves to disperse the pigment in the aqueous medium (See column 3, lines 26-34) is suitable for stabilizing a hydrophobic pigment of 0.005-1microns (5 nm-1000 nm) (See column 7, lines 25-27) in an aqueous medium over long periods (See column 3, lines 15-17).

It is held that the selection of a known material based on its ***suitability* for its intended use** supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." 325 U.S. at 335, 65 USPQ at 301.). See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious); Ryco, Inc. v.

Ag-Bag Corp., 857 F.2d 1418, 8 USPQ2d 1323 (Fed. Cir. 1988) (Claimed agricultural bagging machine, which differed from a prior art machine only in that the brake means were hydraulically operated rather than mechanically operated, was held to be obvious over the prior art machine in view of references which disclosed hydraulic brakes for performing the same function, albeit in a different environment.). See MPEP 2144.07.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a AB block copolymer of Ma et al as a dispersant in Bawendi et al with the expectation of providing the desired stability of aqueous dispersion of nanoparticles since Bawendi et al teach that an outer layer includes **any** molecule having at least one hydrophobic linking moiety that attaches to the surface of the particle and that terminates in at least one hydrophilic moiety and Ma et al teach that a AB block copolymer where A block is hydrophobic and serves to link with a hydrophobic pigment, and the B block is hydrophilic and serves to disperse the pigment in the aqueous medium is suitable for stabilizing a hydrophobic pigment of 0.005-1microns (5 nm-1000 nm) in an aqueous medium over long periods.

As to claims 2 and 4, Ma et al teach that hydrophilic regions contain ionizable groups such as *acidic* groups (See column 6, lines 12-13). To solubilize the B block into the aqueous medium, it may be necessary to make salts of either the acid or amino groups contained in the B block. Salts of the acid monomers can be made with the counter component being selected from nitrogenous bases and sodium and potassium hydroxides. Amphoteric polymers, that is polymer that contains both an acid group and an amino group, may be used as is or can be neutralized with either addition of acid or base. See column 6, lines 12-39.

As to claim 8, Bawendi et al in view of Ma et al fail to teach that the number ratio of the amphipathic dispersant to the plurality of nanoparticles in step (a) is in the range of approximately 50:1 to approximately 5000:1.

Although Bawendi et al teach a 30-fold excess of the amphipathic molecule in example 2, one of ordinary skill in the art at would know that the amount of the amphipathic molecule would depend on particular amphipathic molecule used.

It is held that concentration limitations are obvious absent a showing of criticality. Akzo v. E.I. du Pont de Nemours 1 USPQ 2d 1704 (Fed. Cir. 1987).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant concentration parameters (including those of claim 8) in Bawendi et al in view of Ma et al through routine experimentation in the absence of a showing of criticality.

As to claim 9, Bawendi et al teach that crosslinking neighboring molecules in the coating outer layer provides stability to the layer by creating an effectively multidentate ligand across the semiconductor surface as illustrated schematically in FIG. 3 (See column 15, lines 23-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have crosslinked neighboring molecules in Bawendi et al in view of Ma et al the coating outer layer with the expectation of providing the desired stability to the layer by creating an effectively multidentate ligand across the semiconductor surface, as taught by Bawendi et al.

As to claims 11-12, Ma et al teach that the dispersant is a copolymer of a hydrophilic monomer selected from the group consisting of acrylic acid, methacrylic acid and combinations

thereof (See column 4, lines 40-43), with at least one hydrophobic alkyl (C1–C9) acrylamide monomer (See column 3, lines 35-43).

As to claims 13-16, Ma et al teach that block copolymers have a number average molecular weight below 20,000, preferably below 15,000, and typically in the range of 1,000 to 3,000 (See column 5, lines 1-6).

4. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al in view of Bawendi et al.

Ma et al disclose a method for preparing aqueous dispersions of pigment particles having particle size of 0.005-1microns (5 nm-1000 nm) (claimed nanoparticles) (See column 7, lines 25-27), stabilized by a polymers that are stable over long periods (See column 3, lines 15-17). The polymer is an AB or BAB block copolymer wherein the A block is hydrophobic and serves to link with the pigment, and the B block is hydrophilic and serves to disperse the pigment in the aqueous medium (See column 3, lines 26-34). The hydrophilic regions contain ionizable groups such as *acidic* groups (See column 6, lines 12-13). To solubilize the B block into the aqueous medium, it may be necessary to make salts of either the acid or amino groups contained in the B block. Salts of the acid monomers can be made with the counter component being selected from nitrogenous bases and sodium and potassium hydroxides (See column 6, lines 12-39). The dispersant is a copolymer of a hydrophilic monomer selected from the group consisting of acrylic acid, methacrylic acid and combinations thereof (See column 4, lines 40-43), with at least one hydrophobic alkyl (C1–C9) acrylamide monomer (See column 3, lines 35-43). The block copolymers have a number average molecular weight below 20,000, preferably below 15,000, and typically in the range of 1,000 to 3,000 (See column 5, lines 1-6). The dispersion is prepared

by mixing pigment, polymer and water and then deflocculating the pigment (See column 11, lines 16).

Ma et al fail to teach that the dispersant is prepared by mixing pigment and a polymer dispersant in nonaqueous solvent, removing the solvent, and transferring the dispersant coated particles to water (Claim 1).

Bawendi et al teach that **any** molecule having at least one hydrophobic linking moiety that attaches to the surface of the particle and that terminates in at least one hydrophilic moiety can be used for coating hydrophobic nanoparticles thereby stabilizing them in water (See column 13, lines 5-28). Bawendi et al teach that the hydrophobic nanoparticles can be coated with any dispersant molecule having at least one hydrophobic linking moiety that attaches to the surface of the particle and that terminates in at least one hydrophilic moiety by mixing pigment and a polymer dispersant in nonaqueous solvent, removing the solvent, and transferring the dispersant coated particles to water (See column 21, lines 61-67; column 22, lines 1-5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a method of Bawendi et al for coating hydrophobic pigment nanoparticles of Ma et al with the expectation of providing the desired stable dispersions since Bawendi et al teach that the hydrophobic nanoparticles can be coated with any dispersant molecule having at least one hydrophobic linking moiety that attaches to the surface of the particle and that terminates in at least one hydrophilic moiety by mixing pigment and a polymer dispersant in nonaqueous solvent, removing the solvent, and transferring the dispersant coated particles to water.

As to claim 8, Ma et al in view of Bawendi et al fail to teach that the number ratio of the amphipathic dispersant to the plurality of nanoparticles in step (a) is in the range of approximately 50:1 to approximately 5000:1.

Although Bawendi et al teach a 30-fold excess of the amphipathic molecule in example 2, one of ordinary skill in the art at would know that the amount of the amphipathic molecule would depend on particular amphipathic molecule used.

It is held that concentration limitations are obvious absent a showing of criticality. Akzo v. E.I. du Pont de Nemours 1 USPQ 2d 1704 (Fed. Cir. 1987).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant concentration parameters (including those of claim 8) in Ma et al in view of Bawendi et al through routine experimentation in the absence of a showing of criticality.

As to claim 9, Bawendi et al teach that crosslinking neighboring molecules in the coating outer layer provides stability to the layer by creating an effectively multidentate ligand across the semiconductor surface as illustrated schematically in FIG. 3 (See column 15, lines 23-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have crosslinked neighboring molecules in Ma et al the coating outer layer with the expectation of providing the desired stability to the layer by creating an effectively multidentate ligand across the semiconductor surface, as taught by Bawendi et al.

Response to Arguments

5. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Thursday, 9:00AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ELENA TSOY
PRIMARY EXAMINER
ETsoy

Elena Tsoy
Primary Examiner
Art Unit 1762

November 22, 2005